

**IN THE ABSTRACT:**

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### ABSTRACT OF THE DISCLOSURE

A quartz crystal resonator has a quartz crystal tuning fork base and quartz crystal tuning fork tines connected to the quartz crystal tuning fork base. Each of the quartz crystal tuning fork tines has opposite main surfaces, a groove formed in at least one of the main surfaces, and an electrode disposed in the groove formed in at least one of the main surfaces so that a merit value  $M_1$  of a fundamental mode of vibration of the quartz crystal tuning fork resonator is greater than a merit value  $M_2$  of a second overtone mode of vibration thereof. The merit values  $M_1$  and  $M_2$  are defined by the ratios  $Q_1/r_1$  and  $Q_2/r_2$ , respectively, where  $Q_1$  and  $Q_2$  represent a quality factor of the fundamental mode of vibration and the second overtone mode of vibration, respectively, of the quartz crystal tuning fork resonator and  $r_1$  and  $r_2$  represent a capacitance ratio of the fundamental mode of vibration and the second overtone mode of vibration, respectively, of the quartz crystal tuning fork resonator. A piezoelectric constant  $e_{12}$  of the the quartz crystal tuning fork resonator is within a range of 0.095 C/m<sup>2</sup> to 0.19 C/m<sup>2</sup> in the absolute value.